



09-1001

PCT

422 Rec'd PCT/PTO 07 SEP 2001

FORM PTO-1300 (REV. 11-2000)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER Bhatooolaul 6-19-5
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371			U.S. APPLICATION NO. (If known, see 37 CFR 1.5) 09/936038
INTERNATIONAL APPLICATION NO. PCT/GB99/04166	INTERNATIONAL FILING DATE 10 December 1999	PRIORITY DATE CLAIMED 18 March 1999	
TITLE OF INVENTION Improved Message Access for Radio Telecommunications Systems			
APPLICANT(S) FOR DO/EO/US David Lahiri Bhatooolaul, Qiang Cao, Seau Sian Lim			
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:			
<p>1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.</p> <p>2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.</p> <p>3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.</p> <p>4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31).</p> <p>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))</p> <p>a. <input type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau).</p> <p>b. <input checked="" type="checkbox"/> has been communicated by the International Bureau.</p> <p>c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</p> <p>6. <input type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).</p> <p>a. <input type="checkbox"/> is attached hereto.</p> <p>b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4).</p> <p>7. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))</p> <p>a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau).</p> <p>b. <input type="checkbox"/> have been communicated by the International Bureau.</p> <p>c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</p> <p>d. <input type="checkbox"/> have not been made and will not be made.</p> <p>8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</p> <p>9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</p> <p>10. <input type="checkbox"/> An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</p>			
Items 11 to 20 below concern document(s) or information included:			
<p>11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</p> <p>12. <input checked="" type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</p> <p>13. <input type="checkbox"/> A FIRST preliminary amendment.</p> <p>14. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment.</p> <p>15. <input type="checkbox"/> A substitute specification.</p> <p>16. <input type="checkbox"/> A change of power of attorney and/or address letter.</p> <p>17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.</p> <p>18. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4).</p> <p>19. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).</p> <p>20. <input type="checkbox"/> Other items or information:</p>			

"Express Mail" mailing label	
number	EK 218524030WJ
Date of Deposit	Sept 7, 2001
I hereby certify that this app is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 57CFR 1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks Washington, D.C. 20231	
Margaret R. Walton	
(Printed name of person mailing paper of fee)	
Margaret R. Walton	
(Signature of person mailing paper of fee)	

U.S. APPLICATION NO. 09/936038 <small>37 CFR 1.53</small>		INTERNATIONAL APPLICATION NO. PCT/GB99/04166		ATTORNEY'S DOCKET NUMBER Bhatoaul 6-19-5	
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21. <input type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1000.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$860.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$710.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$690.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 ENTER APPROPRIATE BASIC FEE AMOUNT =				CALCULATIONS PTO USE ONLY	
				\$	860.00
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	\$	
Total claims	3 - 20 =	0	x \$18.00	\$	0
Independent claims	1 - 3 =	0	x \$80.00	\$	0
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$270.00	\$	0
TOTAL OF ABOVE CALCULATIONS =				\$	860.00
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$	
SUBTOTAL =				\$	860.00
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$	
TOTAL NATIONAL FEE =				\$	860.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +				\$	40.00
TOTAL FEES ENCLOSED =				\$	900.00
				Amount to be refunded:	\$
				charged:	\$


a. ☐ A check in the amount of \$ _____ to cover the above fees is enclosed.

b. ☒ Please charge my Deposit Account No. 12-2325 in the amount of \$ 900.00 to cover the above fees.
 A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
 overpayment to Deposit Account No. 12-2325. A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. Credit card
 information should not be included on this form. Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR
 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO: Docket Administrator Lucent Technologies Inc. Room 3J-219 101 Crawford's Corner Road Holmdel, NJ 07733-3030	<div style="text-align: center;">  SIGNATURE </div> <div style="text-align: center;"> Claude R. Narcisse NAME </div> <div style="text-align: center;"> 38979 REGISTRATION NUMBER </div>
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PTO/PCT Rec'd 07 SEP 2001
IMPROVED MESSAGE ACCESS FOR

RADIO TELECOMMUNICATIONS SYSTEM

077936036

5 This invention relates to an improved message access arrangement for a radio telecommunications system such as Universal Mobile Telecommunications System (UMTS) and relates especially to message acquisition indications.

To make a connection to the UMTS system, in known arrangements a mobile telephone sends its preamble at a first power, and waits for an acquisition indication on the Acquisition Indication Channel (AICH); if no indication is received, the preamble is resent
10 at increased power, in steps, until an indication is received on the AICH. The message is then sent and if no positive acknowledgement is received via the Forward Access Channel (FACH), the message is assumed to be corrupted and it is resent. The total time spent by the mobile in waiting for acknowledgements can be considerable.

Further, checking of received preamble and message involves the Physical Layer
15 (layer 1) and the Data Link Layer (layer 2) of the node (?) handling the connection; layer 2 may be located in the Base Transceiver Station (BTS) but it may alternatively be located in the Base Station Controller (BSC); the total time required for the messages to pass can add to the waiting time.

In WO 98/18280 Ericsson there is disclosure of a mobile station transmitting a random access request frame, which includes an error deduction redundancy field, but there is no specification as to when and to where the result of the
5 error detection field test is sent.

Figure 7 illustrates how random access acquisition indication and forward access channels interact to acknowledge preamble and message signals from a mobile.

The invention will be described with reference to figures 8 and 9 in which :-

Figure 8 illustrates how the random access and acquisition indication channels
 5 interact to acknowledge preamble and message signals from a mobile; and

Figure 9 illustrates the new message route.

In Figure 1, a part 10 of the UMTS is illustrated, comprising a plurality of mobile systems (MS) 12, 14, 16 associated with a telecommunications cell controlled by a Base Transceiver Station (BTS) 18 having a Base Station Controller (BSC) 20.

10 When a mobile such as 12 wishes to make a call, it utilises the Random Access Channel (RACH) of the UMTS which is mapped to the Physical Random Access Channel (PRACH). Transmission in this transport channel is based on the well known slotted Aloha approach, that is, a mobile can start a transmission of the PRACH at any one of a number of well defined time offsets, denoted access slots AS and illustrated in Figure 2. The slots are
 15 spaced 1.25 milliseconds apart. Several of the slots in Figure 2 are shown as filled by random access transmissions 30, 32, 34, 36.

Figure 3 illustrates the structure of a Random Access Transmission such as transmission 30; there are several preamble parts 40a, 40b, 40i, each of length 1 millisecond, and an access burst 42 which contains the preamble part, plus a message part
 20 of length 10 milliseconds.

Figure 4 shows the structure of the access burst 42. Between a preamble 40j and the message part 44 there is an idle time period of length 0.25 milliseconds. This idle period allows for detection of the preamble part and subsequent online processing of the message part.

25 Figure 5 shows that the RACH message part 44 consists of a data part 46, corresponding to the uplink Dedicated Physical Data Channel (DPDCH) and a layer 1 control part 48, corresponding to the uplink Dedicated Physical Control Channel (DPCCH). The data and control parts 46, 48 are transmitted in parallel.

The data part 46 carries layer 2/layer 3 messages requesting radio resources or a user
 30 packet. The spreading factor of the data part is limited to $SF_{\mathcal{C}}\{256,128,64,32\}$ corresponding to channel bit rates of 16, 32, 64 and 128 Kbps respectively. The control

part 48 carries pilot bits 50 and rate information 52, using a spreading factor of 256. The rate information indicates a spreading factor of the channelisation code which is used on the data part.

For RACH transmission, the technique of preamble power ramping is used, and the procedure used by a random request has the following actions:-

- 1 After cell search and synchronisation, the mobile 12 reads the Broadcast Control Channel (BCCH) (not illustrated) to get information about
 - i the preamble spreading code(s)
 - 10 ii the available signatures
 - iii the available access slots
 - iv the available spreading factors for the message part
 - v the uplink interference level in the cell
 - vi the primary CCPCH (Common Control Physical Channel) transmit power level
 - 15 level
- 2 The MS selects a preamble spreading code and thus the message scrambling code.
- 3 The MS selects a preamble signature and uses it to determine the primary node of
 - 20 the channelisation codes used by the message part of the access burst.
- 4 The MS selects a channelisation code (corresponding to a spreading factor) for the message part.
- 25 5 The MS estimates the downlink path loss (by using information about the transmitted and received power level of the primary CCPCH), and determines the required uplink transmit power (by using information about the uplink interference level in the cell).
- 30 6. The MS implements the dynamic persistence algorithm by:
 - Reading the current dynamic persistence value from the BCH.

- Performing a random draw against the current dynamic persistence value.
 - Deferring transmission for one frame and repeating step 6 if the result of the random draw is negative, otherwise proceeding to step 7.
- 5 7. The MS randomly selects an access slot from the available access slots.
8. The MS transmits its preamble at a negative power offset relative to the estimated uplink transmit power. This is illustrated at reference 60 in Figure 7.
- 10 9. The MS waits for an acquisition indication (on the AICH) from the network side. If none is received within a predefined time-out period, the MS transmits the preamble again but with a smaller power offset and a re-selected preamble signature, reference 62, showing the higher power.
- 15 10. Step 8 is repeated, reference 64, showing a further increase in power, and an acquisition indicator 66 is received from the network side that indicates the acceptance by the network side of the preamble at that power offset. The acquisition indicator 66 is received on the AICH.
- 20 11. If an acquisition indicator is received on the AICH in Step 9, the random access burst is transmitted in the next available access slot. This burst comprises a repeated preamble 64A and a message 68.
12. If the message 68 is corrupted, as indicated by the dotted lines, then there is no
 25 positive acknowledgement and actions 1 to 11 are repeated, references 70 to 78; message 78 is successfully received, and an acknowledgement 80 is sent from the network on FACH.

Referring again to Figure 6, actions 1 to 12 involve the physical layer L1 of the MS
 30 12, the physical layer L1 of the BTS 18, and the physical layer L1 and the Data Link Layer L2 of the BCS 20; a Cyclic Redundancy Code (CRC) check is applied by the BTS 18 in

layer L1, but the outcome is sent to layer L2 of the BSC 20, which puts the positive acknowledgement 80 onto the FACH.

When the message is corrupt, 68, layer L2 of the BSC 20 does not send acknowledgement 80.

- 5 It is clear that the Waiting Time (WT) of the MS12 before successful connection can be long; this applies even when the message is not corrupted.

Turning now to the invention, Figure 8 shows similar integers to Figure 7, advanced by 100, and actions 1 to 11 occur as in the prior art, integers 160 to 168. However, when the corrupted message 168 is received, a negative acknowledgement 171 is sent to the
10 MS12 by the BTS 18, and actions 5 to 11 are repeated. If there is no negative acknowledgement 171, the MS 12 assumes that the RACH transmission has been successful.

Figure 9 illustrates that, with application of the invention, the longer route to the BSC 20 and its layer L2 is no longer involved, and thus considerable time is saved.

- 15 Further, since a negative acknowledgement message 171 is sent only in the relatively rare case of a corrupted message, traffic volume over the air interface is reduced. Also, sending the signal 171 avoids the time-out present in the prior art arrangement.

While the AICH could be arranged to send positive acknowledgement signals after CRC checking of a message, the advantage of a reduction in traffic volume would then not
20 be achieved.

WO 00/56106

CLAIMS

- 1 A radio mobile telecommunications system comprising a base transceiver station (18) arranged to manage a plurality of mobile systems (12, 14, 16) within at least one telecommunications cell; the base station (18) having means to provide an acquisition indication channel by which preamble signals (80, 82, 84) sent by a mobile system (12) to the base station (18) are acknowledged when the strength of a preamble signal (84) reaches a predetermined level, characterised in that the acquisition indication channel is further arranged to send a negative acquisition signal (171) when a message (168) sent by the mobile system (12) is unacceptable.
- 2 A system according to Claim 1 in which a negative acquisition signal (171) is sent when the message (168) sent by the mobile system (12) fails a cyclic redundancy code check performed in the base transceiver station (18).
3. A method of operating a radio mobile telecommunications system comprises :-
sending spaced preambles (160, 162, 164) of increasing strength from a mobile (12) to a base transceiver station (18);
sending a preamble acknowledgement signal (166) on an acquisition indication channel from the base transceiver station (18) to the mobile system (12) when a preamble (164) reaches an acceptable strength;
and sending a message signal (168, 178) from the mobile system (12) to the base transceiver station (18); characterised by :-
further sending a negative acknowledgement signal (171) on said acquisition indication channel from the base transceiver station (18) to the mobile system (12) indicating a corrupt message (168).

FIG. 1

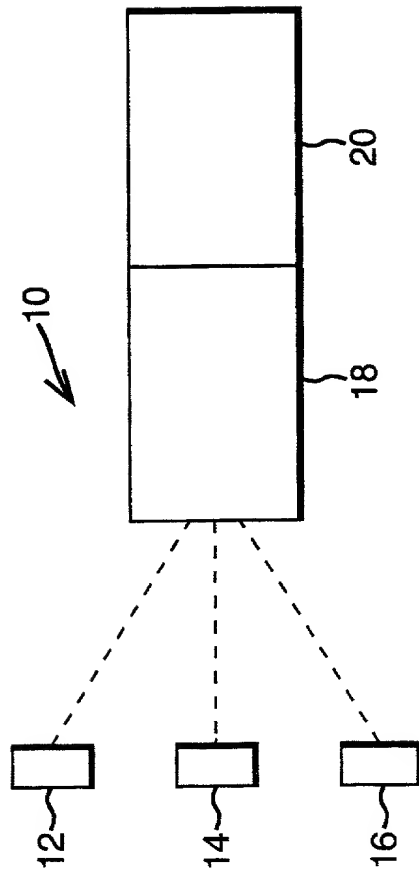


FIG. 2

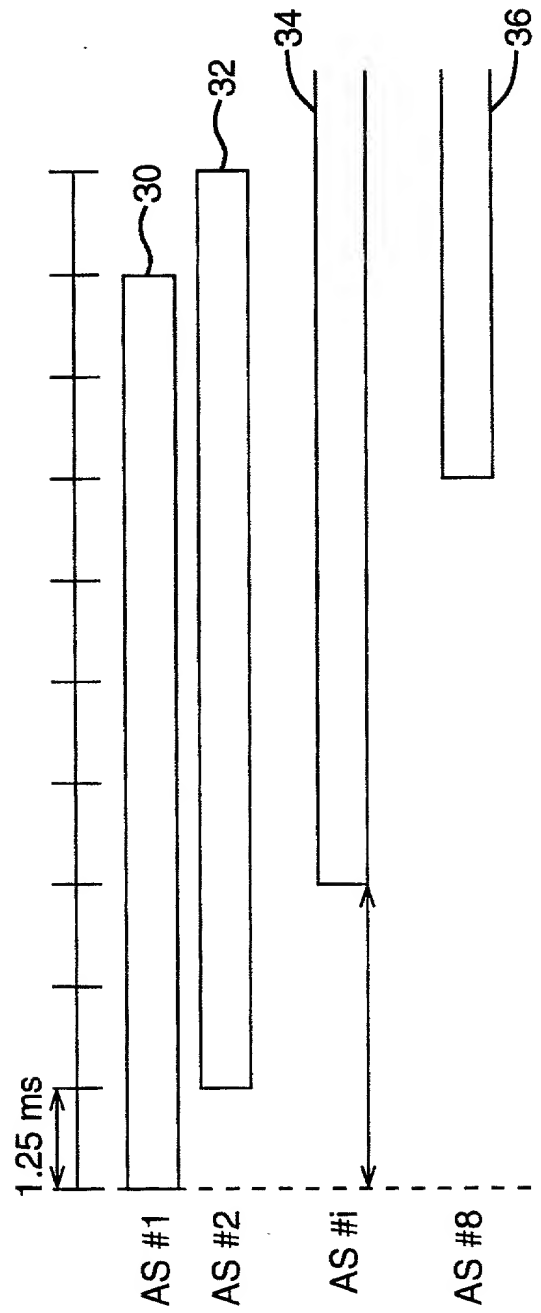


FIG. 3

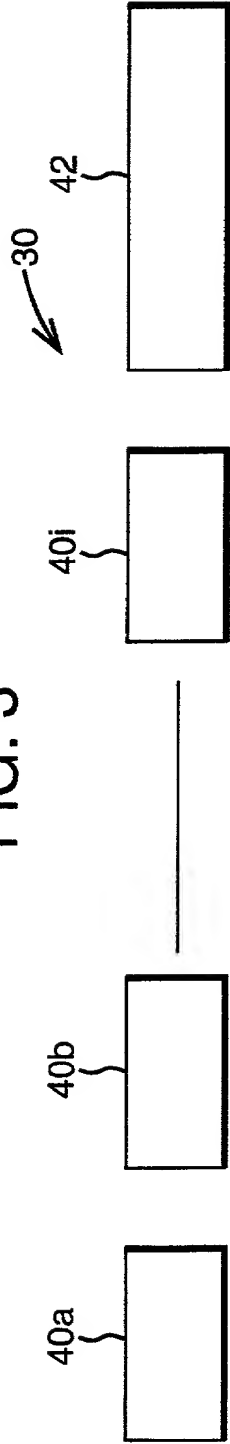


FIG. 4

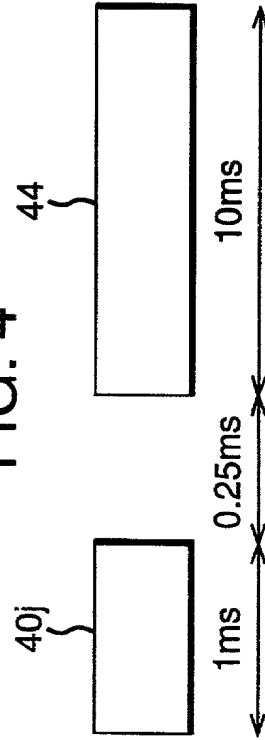


FIG. 5

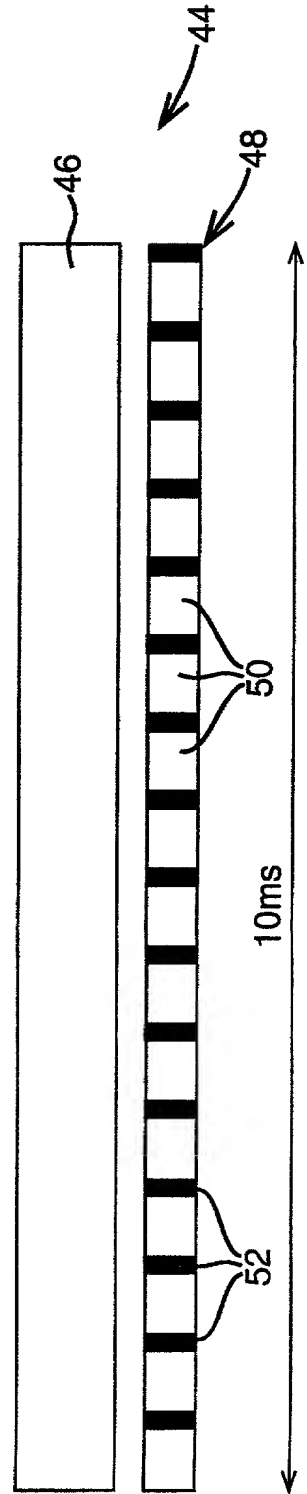


FIG. 6

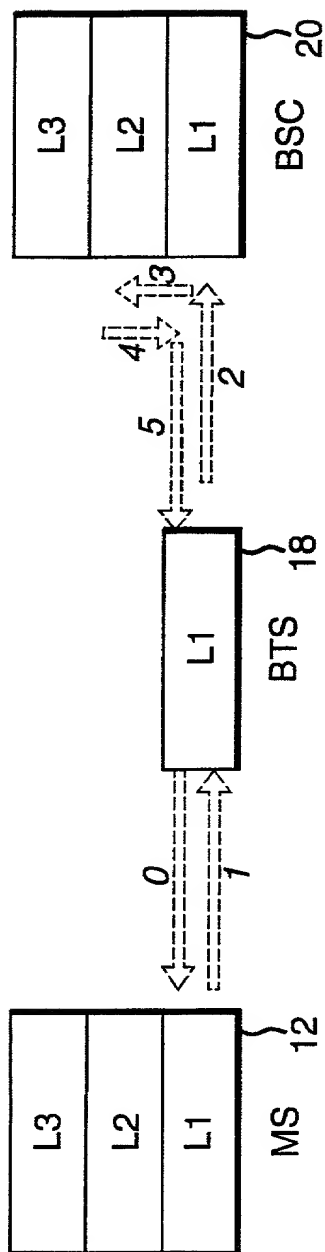


FIG. 7

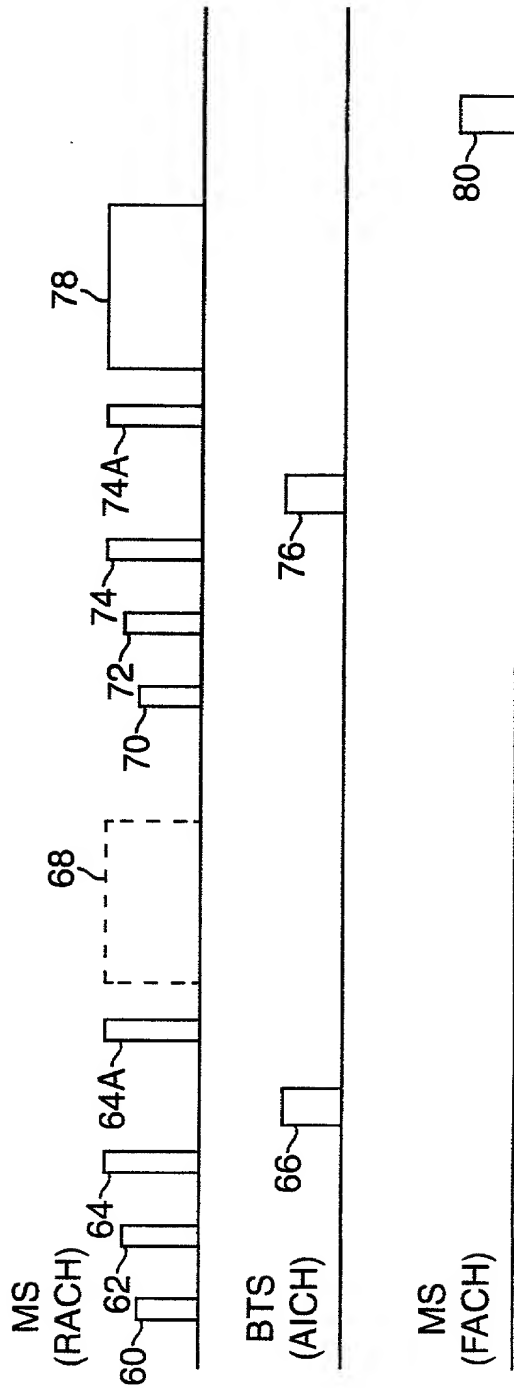


FIG. 8

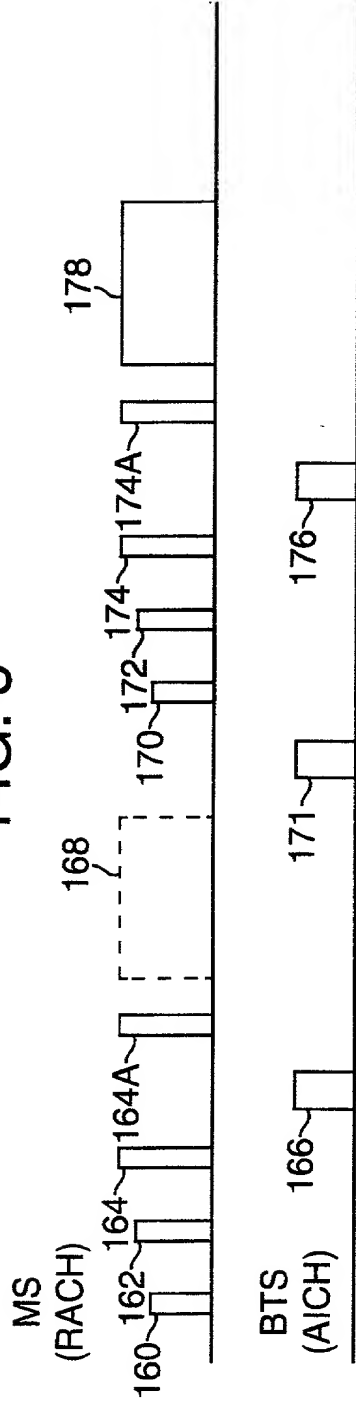
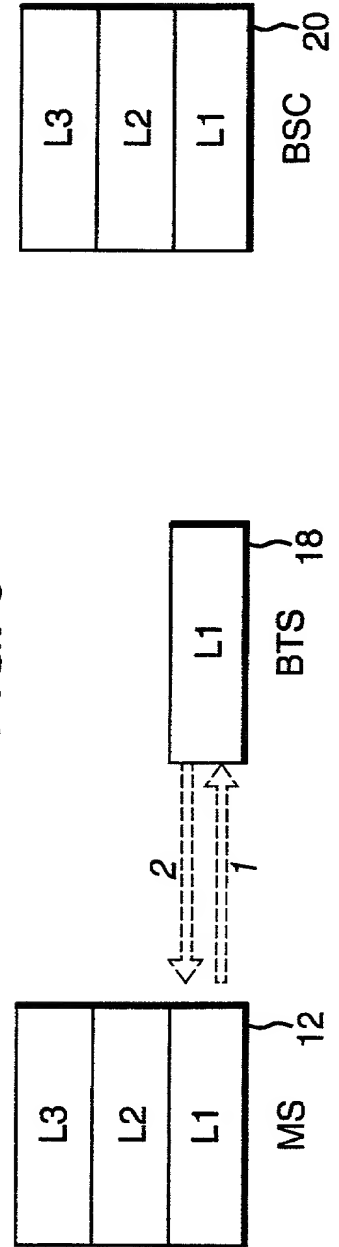


FIG. 9



IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE

Declaration and Power of Attorney

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled **Improved Message Access For Radio Telecommunications Systems** the specification of which

☐ is attached hereto

OR

☐ was filed on _____ and granted Application Serial Number _____.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by an amendment, if any, specifically referred to in this oath or declaration.

I acknowledge the duty to disclose all information known to me which is material to patentability as defined in Title 37, Code of Federal Regulations, 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

GB Application No. 9906198.8 filed 18 March 1999

I hereby claim the benefit under Title 35, United States Code, 120 of any foreign application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, 112, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

**International
Application No.**
PCT/GB99/04166

Filing Date
10TH December 1999

Status
Filing

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States

Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I hereby appoint the following attorney(s) with full power of substitution and revocation, to prosecute said application, to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent and Trademark Office connected therewith:

Kenneth M. Brown	(Reg. No. <u>37590</u>)
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Martin I. Finston	(Reg. No. <u>31613</u>)
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Eli Weiss	(Reg. No. <u>17765</u>)

I hereby authorize these attorneys to insert in the above blanks the filing date and application serial no. when known.

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25/5/01

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Date

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